of the special observation on which the generalised statements are founded. We are, therefore, unable to tell how much is fact and how much inference; and, what is probably the result of careful life-long observation fails to produce that effect of reality which a more direct narrative style would have given to it. In a few cases, however, he gives us actual observations; as when he proves that animals can count, by stating the fact that in order to destroy crows, which were destructive to game, a hut was made at the foot of a tree where there was a nest, in order to shoot the old birds when they returned to their young. It was found, however, that after the first time the man was always watched into the hut, and the crows would not return till he had left it or till night. To deceive them two men went to the door of the watch-house, one entering and the other passing on, but the crows would not come. The next day three went and two passed on, but still with no effect; and it was not till five or six went and all but one passed on, that they were deceived, being unable to count so many.

M. Leroy appears to reject altogether what is commonly termed Instinct, maintaining that the word should be applied only to those acts which are the direct consequences of organisation, such as the grazing of the stag, or the flesh-eating of the fox; but not to the expedients to which those animals resort in the gratification of their natural wants, which are due to sensation, observation, memory, and experience. To the objection that many animals perform complex operations perfectly well without experience, and always in the same manner, he replies that in many cases the fact is not so. He maintains, for instance, that there is a distinctly perceptible inferiority in the nests made by young birds, thus anticipating the observation of the American Wilson; and further remarks that the best constructed nests are formed by birds whose young remain a long time in them, and thus have more opportunity of seeing how they are made He says that the nests of young birds are ill-made and badly situated; and that the defects of these first constructions are remedied in time, when their builders have been instructed by their sense of the inconveniences they have endured. He maintains that nests of the same species of bird differ as much as human dwellings, and that of a hundred swallows' nests no two are exactly alike; and he imputes to want of long-continued observation our failure to discover improvement in them; a want which curiously enough, has been remedied by M. Pouchet, who has found a decided improvement in the nests of swallows at Rouen during his own lifetime. Our author has also some excellent remarks on hereditary habit, as strikingly shown in the case of many of our sporting dogs, and which, he believes, in wild animals is often mistaken for instinct; and he concludes that "It is possible that the actions which we see performed by some animals, independently of the teachings of experience, are the fruit of a knowledge of very ancient date, and that in former times a thousand trials, attended with more or less success, have finally led to the attainment of the degree of perfection which we see manifested in some of their works at the present day."

The migrations of birds, also, he maintains are the result of no blind instinct, but of instruction handed down from generation to generation. He says, "Let us take the swallows as an example which every one can observe. In the first place, their departure is always preceded by assemblages, the frequency and duration of which can leave no doubt that their object is to effect all the necessary preparations for a voyage undertaken by creatures who have the faculty of sensibility, and of understanding one another, and who are united for a common purpose. The incessant and varied twittering which reigns in these assemblies, clearly indicates communications and orders, indispensable for the numerous offspring of the year. They must stand in need of preliminary instruction, constantly repeated, to prepare them for the great event. Frequent trials of flight are no less indispensable, and are often followed by a repetition of previous lessons, which makes our roofs and chimneys ring again. Assemblies of men who should speak a foreign language could not give more evident signs of a similar project. But there is a more convincing proof than this analogy that these migrations are not the result of a blind and mechanical inclination. When, at the time fixed upon for the flight, which cannot, owing to weather, be retarded without compromising the welfare of the whole species, some, and even a large number of indviduals, are too young to follow the rest, they are left behind and remain in the country. But it is in vain that they reach maturity; the supposed *attraction towards a certain region* dees not affect them, or too slightly to enable them to gratify it. They perish, the victims of their ignorance, and of the tardy birth which made them unable to follow their parents."

The letters on Man, which are curiously mixed up with those on animals, are neither so interesting nor so well reasoned. Their object is mainly to deduce the complex phenomena of human existence from the two principles of "the love of ease" and "*ennui*," which being antagonistic, lead men to all kinds of expedients to secure the one or escape from the other. These, with sympathy, which he considers the pre-eminently human emotion, are made to explain most of the facts of man's mental nature. The work is written throughout in a pleasing and simple style, and exhibits to us a loving student of nature who observed and thought for himself, and who, in many of his conceptions, was far in advance of the great philosophers of the last century, among whom he lived.

ALFRED R. WALLACE

OUR BOOK SHELF

Use and Limit of the Imagination in Science. By Prof. Tyndall. (London: Longmans and Co.)

THIS is a second edition of Dr. Tyndall's Discourse at the meeting of the British Association at Liverpool. To it is now appended his Address as president of Section A of the British Association at the Norwich meeting. This was analysed by Dr. Clark Maxwell at a later meeting (see NATURE, Liverpool Meeting, Address to Section A). There is also added a short Essay from the *Saturday Review*, with the quaint title of "Earlier Thoughts," suggesting the irrepressible "Country Parson," A.K.H.B. Another curious addition is a selection of favourable, unfavourable, and often ridiculous critiques of various parts of his discourse; which reveal the existence of a strange state of things in the arcana of editorial dens.

One or two trenchant notes are appended to the Dis-

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course. That regarding "microscopists" and spontaneous germ-formation is especially deserved and well laid on. This race of pseudo-experimenters, who do not know the simplest necessities of accurate experiment, but who by mere assertion endeavour to bear down genuine scientific men, is really the class which does mischief alike to science and to the cause of religion. Dr. Tyndall is certainly not fairly censured by the so-called "religious" press, but does it ever deal either praise or censure fairly? His remarks on the Materialists at the end of the Address are quite conclusive as to the absurdity and injustice of calling him by that name. There is a verse in Scripture that would suit the case exactly, but we leave the problem as a puzzle to the Editor of the *Record*.

The Student's Manual of Comparative Anatomy and Guide to Dissection. By G. Herbert Morrell, M.A., B.C.L. (Oxford: Shrimpton.)

WE have received the only part as yet published of this treatise, viz., that relating to the Birds. Mr. Morrell gives with great care, in a tabular form when possible, a condensation of all the information to be obtained in such works as Huxley's "Lectures on the Skull," and "Classification of Birds," Wagner's, Siebold's and other manuals, and the "Cyclopædia of Anatomy and Physiology," supplementing this by extracts from his own notes of dissections in the anatomical laboratories of the Oxford University Museum, and of Professor Rolleston's lectures given there. It is proposed to issue an atlas of woodcuts borrowed from various works to illustrate the letterpress. The book will be found very convenient by students at Oxford and elsewhere, who are carefully studying the comparative anatomy of the Vertebrata. We must decidedly object, however, to the omission of one group of organs *entirely* —the reproductive. It is a concession to a strange prejudice, and really renders a good work incomplete.

E. R. L.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his Correspondents. No notice is taken of anonymous communications.*]

The Eclipse Expedition

I WRITE you a brief account of the doings of the English Eclipse Expedition up to the present time, thinking it may be interesting to your readers.

After leaving London we proceeded direct to Naples, staying on the road only a few hours at Cologne, half a day at Verona, and a day at Rome. Everywhere on the journey the most marked kindness was shown to the Expedition as the representatives of English Science. From Ostend to Verona we never changed carriages, and there only on account of a slight breakage in the carriage itself. Never once were we asked for passports, never once were our instrument cases overhauled, or anything beyond mere personal baggage, at the custom houses. At Naples we stayed a day, which was occupied in taking the lids off all the cases, repairing one or two slight accidents which had befallen the instruments, and making plans for our distribution in Sicily.

At four o'clock in the afternoon of Wednesday, the 13th, we were all on board the *Psyche*, a despatch boat which had been lent by the Government to convey ourselves and instruments to Sicily. A delicious sunny afternooon, a sea as smooth as molten glass, a ship's company receiving us with the utmost kindness and hospitality, how could the evening not pass as merry as a marriage bell? I cannot retail to you all the jokes which passed, the lively chats and quiet strolls by moonlight, the polariscopes and spectroscopes pointed to the sea and sky, ere long destined to address their momentous questions to the Sun himself, now having their merits and demerits freely discussed by the *savants*; but you can imagine it all. At last we turned in to enjoy that repose which sea air always induces in landsmen.

At about six we were all called and told we were approaching the Straits of Messina, the very Scylla and Charybdis of our classical lore. In moonlight, soft, cool, and delicious, we beheld those rocks of Scylla and steered through Charybdis, though we felt it not, and so onwards in the rising sun through the Straits. After breakfast we held our (as we then though.) final council only about an hour before we were to separate for our various Sicilian stations. Scarcely had the council broken up, when the sad event occurred which was destined to alter all our plans. We were steaming along about ten miles north of Catania, the gigantic cone of Etna, capped with snow, appearing to rise from the cliffs of lava under which we were passing, when the ship struck on a treacherous sunken rock, shown in none of the charts. I cannot pass over this sad catastrophe without referring to the noble behaviour of our gallant commander, Lieut. Fellowes, to whose coolness and energy we owe the safe disposal of ourselves, instruments, and baggage at Catania, without any serious loss. Mr. Lockyer, at the request of the captain, immediately telegraphed to Malta, whence the *Royal Oak* came to the aid of the *Psyche*. More lately the admiral of the Mediterranean fleet (Sir Hastings Yelverton) has arrived in the *Lord Warden*, and anchored beside her, and I am glad to be able to say that if the present calm weather continues there is every prospect that the ship may be saved.

For this expedition it was found necessary to make Catania the head quarters instead of Syracuse, as had been originally intended, as there would inevitably have been too great delay in removing the heavier instruments to Syracuse to carry out the original plan. Since our arrival, we have received all possible help from our own and the Italian Governments. From the latter we obtained the use of the garden of the Benedictine monastery, where we are working, as well as guards at some of our stations. Both here and elsewhere the American and Italian observers join heartily with us, and to their co-operation we owe much.

The arrangement of the English parties are now as follows. At Catania we are strong in the spectroscope. Mr. Lockyer and Mrs. Lockyer are working with a large reflecting mirror fitted with a single prism, but with special adaptation for giving plentiful illumination, as well as for placing the hydrogen spectrum side by side with the spectrum obtained from the corona. Mr. Seabrokes has a large refractor fitted with a spectroscope of six prisms for examining the chromosphere. Mr. Pedler works with a small direct-vision instrument. Prof. Thorpe has mounted his apparatus on the top of a portico in the garden, and has been engaged the last few days in making out daily curves of the chemical intensity. To Mr. Vignolles, sen., and Mr. Vignolles, jun., and myself are committed the time and general observations. In addition to the above, we hope to have the assistance of several of the officers from ships in the neighbourhood, who will make sketches of the appearances, and help the observers in various ways.

Our next detachment, under the charge of Prof. Roscoe, has left us, intending to find a stage of observation as high as possible on Etna. It is confidently expected that, by leaving some seven or eight thousand feet of the densest atmosphere behind, delicate but important observations may be made which would be impossible at a lower level. This party is piloted by Prof. Sylvestre, of the University of Catania, who, in common with all the authorities here, has shown the utmost courtesy toward the Expedition. The spectroscope observations will be conducted by Prof. Roscoe, with the assistance of Mr. Bowen; the polariscope is under the charge of Mr. Harris; photographic arrangements under Dr. Vogel; while Mr. Darwin will sketch the appearances presented.

At Agosta we are strongest in the polariscope, this instrument requiring the longest possible duration of totality. The party is under the charge of Prof. Adams (of King's College, London), who, in the polariscope, is assisted by Messrs. Ranyard and Clifford. The only spectrocopist stationed here is Mr. Burton, and the sketcher, Mr. Brett. This party have been living under canvas for the last few days, and, I need hardly add, received the utmost kindness from a military detachment stationed there with them.

At Syracuse we are only represented by one photographer, Mr. Brothers, assisted by Mr. Fryer and by Mr. Griffith, who will take observations with his polarimeter.

The authorities at Malta sent us here two sappers, thanks to whose exertions our observations have been erected with great rapidity, enabling us to station our instruments and make preliminary trials in the very positions they will occupy during the Eclipse. Since our arrival these preliminaries have kept us all

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